Claims

We claim:

1   1. A method for communicating a bit stream using turbo coding comprising:

2   encoding each input bit in the bit stream using a single 1/3 rate turbo

3   encoder to produce a set of three bits for each input bit;

4   repeating one of the three bits in each set to produce a set of four bits for

5   each input bit;

6   increasing a time interval between the four bits in the set before transmitting

7   the set of four bits on a communications channel;

8   decreasing the time interval between the set of four bits received via the

9   communications channel;

10   diversity combining the received set of four bits into a received set of three

11   bits; and

12   decoding each received set of three bits using a 1/3 rate turbo decoder to

13   recover an output bit for each input bit.

1   2. The method of claim 1 wherein encoding uses two coders, each with a 1/2 rate

2   turbo coder, and a first interleaver.

1   3. The method of claim 1 wherein one of the three bits is repeated in a cyclic

2   manner.

1   4. The method of claim 1 wherein the time interval is increased with a second

2   interleaver.

1   5. The method of claim 1 wherein the time interval between any two identical bits

2   is larger than a channel coherent time.

1   6. The method of claim 1 wherein diversity combining uses selection diversity.

1   7. The method of claim 1 wherein diversity combining uses equal gain diversity.

1   8. The method of claim 1 wherein diversity combining uses maximum ratio

2   combining.

1   9. The method of claim 1 wherein the decoding uses maximum a prior processes.

1   10. The method of claim 1 wherein the diversity combining is applied to the set of

2   four received bits.

1   11. A system for communicating a bit stream using turbo coding comprising:

2   a transmitter further comprising a single 1/3 rate turbo encoder configured to

3   encode each input bit in the bit stream using to produce a set of three bits, a bit

4   repeater configured to repeat one of the three bits in each set to produce a set of

5   four bits for each input bit, and an interleaver configured to increase a time interval

6   between the four bits in the set before transmitting the set of four bits on a

7   communications channel; and

8   a receiver further comprising a de-interleaver configured to decrease the

9   time interval between the set of four bits received via the communications channel,

10   a diversity combiner configured to reduce the received set of four bits into a

11   received set of three bits, and a single 1/3 rate turbo decoder configured to decode

12   each received set of three bits to recover an output bit for each input bit.